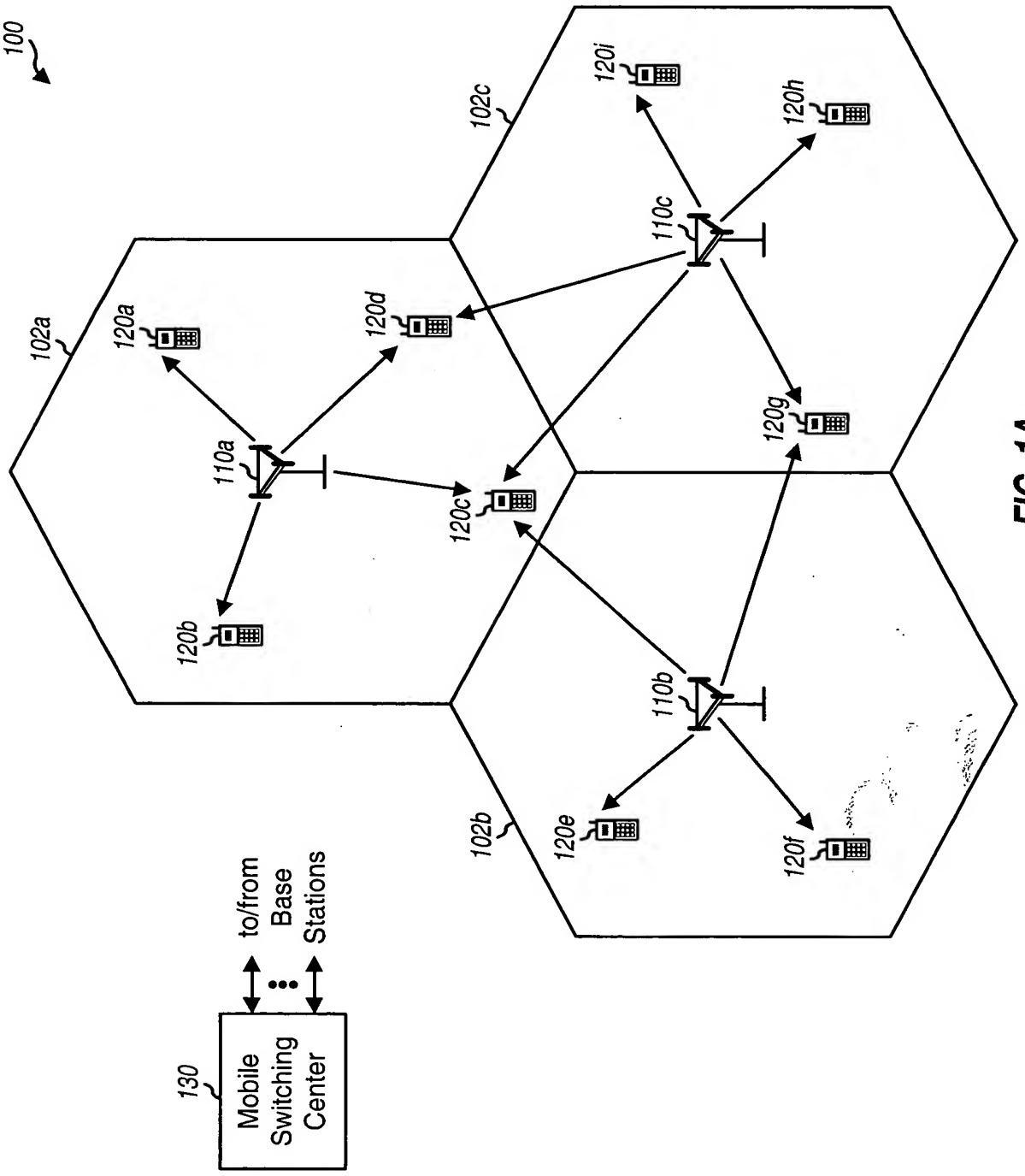
100
102a
102b
102c
110a
110b
110c
120a
120b
120c
120d
120e
120f
120g
120h
120i
130
Mobile Switching Center
to/from Base Stations

FIG. 1A

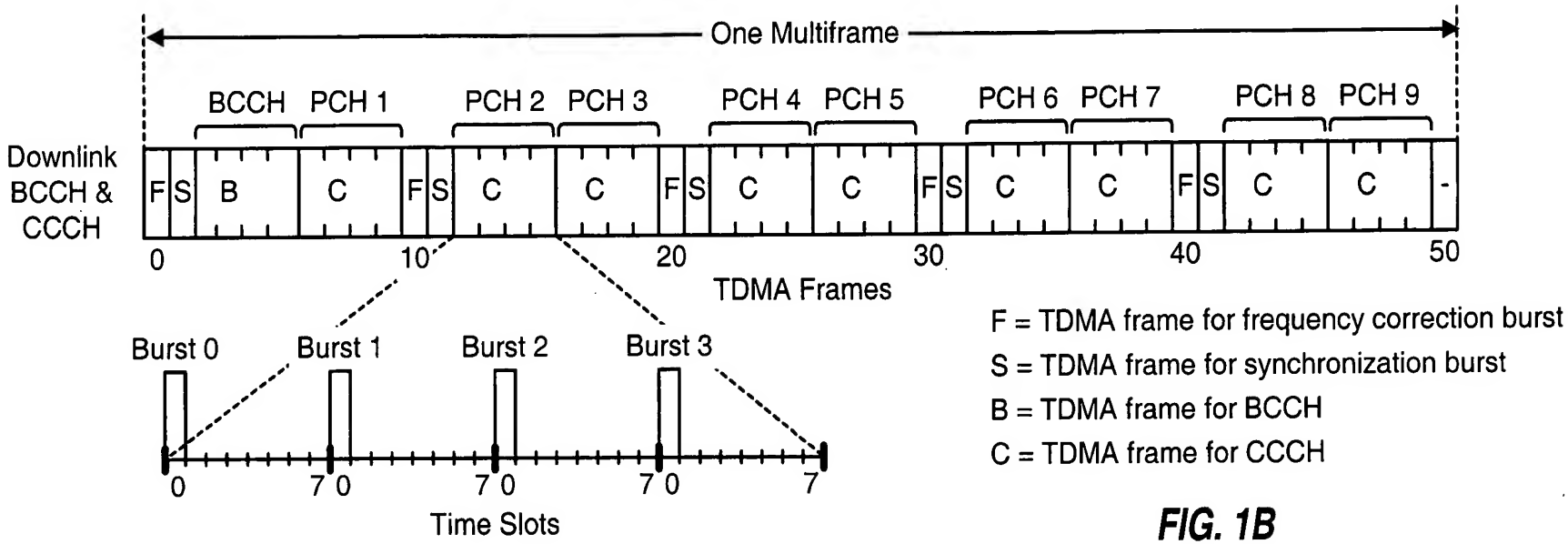
One Multiframe
BCCH
PCH 1
PCH 2
PCH 3
PCH 4
PCH 5
PCH 6
PCH 7
PCH 8
PCH 9
Downlink BCCH & CCCH
F S B C F S C C F S C C F S C C F S C C -
0
10
20
30
40
50
TDMA Frames
Burst 0
Burst 1
Burst 2
Burst 3
0
7 0
7 0
7 0
7
Time Slots
F = TDMA frame for frequency correction burst
S = TDMA frame for synchronization burst
B = TDMA frame for BCCH
C = TDMA frame for CCCH

FIG. 1B

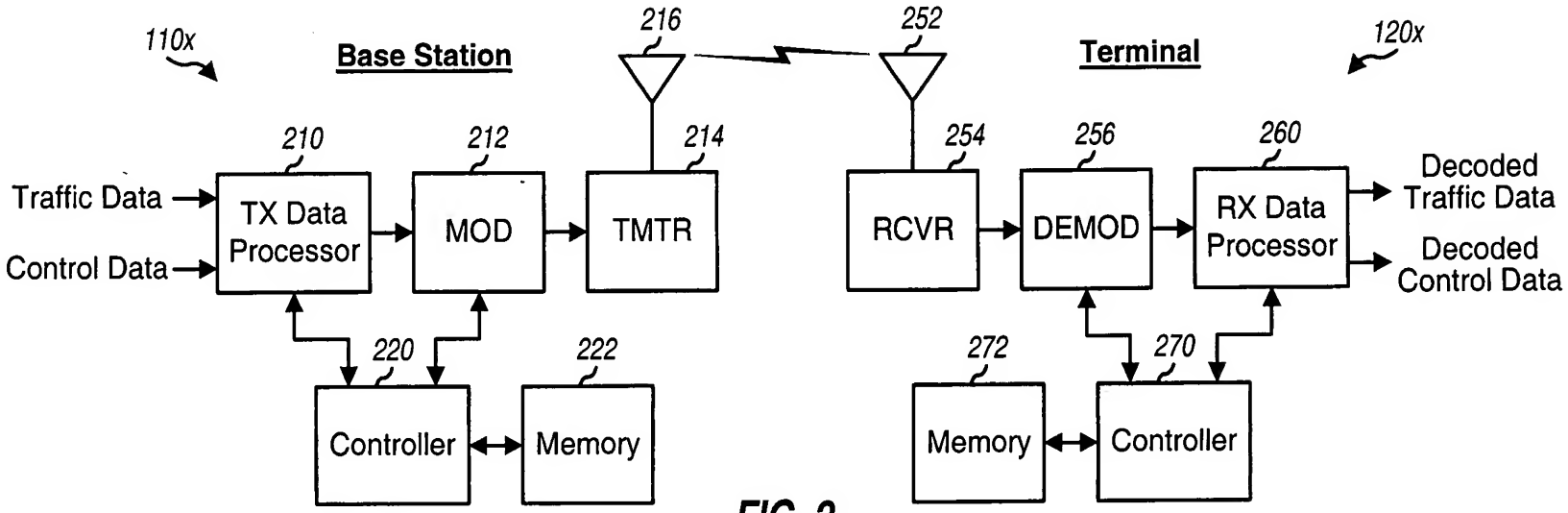
110x
Base Station
216
252
Terminal
120x
210
212
214
254
256
260
Traffic Data
Control Data
TX Data Processor
MOD
TMTR
RCVR
DEMOD
RX Data Processor
Decoded Traffic Data
Decoded Control Data
220
222
272
270
Controller
Memory
Memory
Controller

FIG. 2

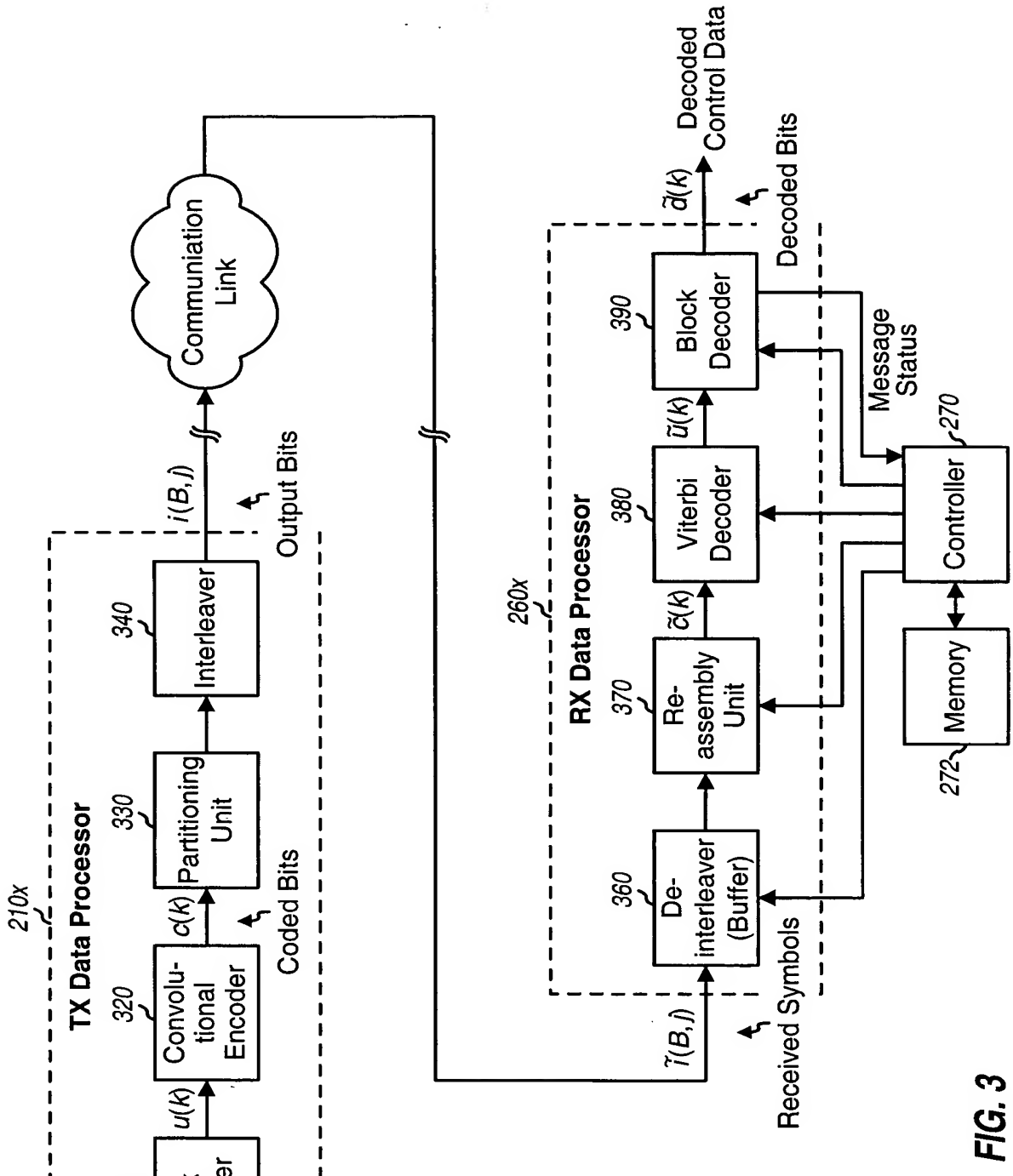
Control Data
d(k)
Info Bits
210x
TX Data Processor
310
Block Encoder
u(k)
320
Convolu-tional Encoder
c(k)
Coded Bits
330
Partitioning Unit
340
Interleaver
i(B,j)
Output Bits
Communiation Link
260x
RX Data Processor
360
De-interleaver (Buffer)
ĩ(B,j)
Received Symbols
370
Re-assembly Unit
c̃(k)
380
Viterbi Decoder
ũ(k)
390
Block Decoder
d̃(k)
Decoded Control Data
Decoded Bits
Message Status
270
Controller
272
Memory

FIG. 3

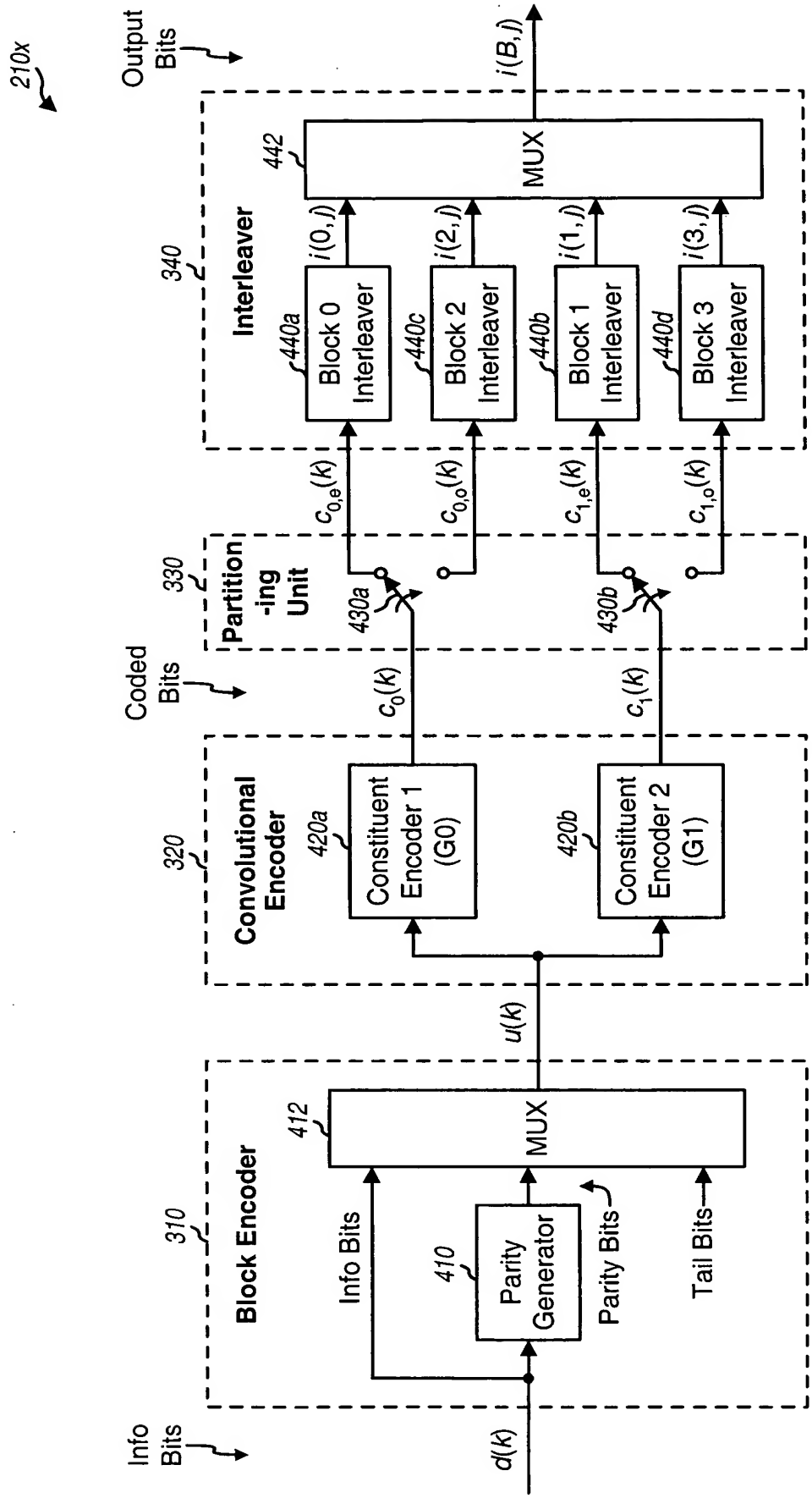
210x
Info Bits
d(k)
Block Encoder
310
Info Bits
Parity Generator
410
Parity Bits
Tail Bits
412
MUX
u(k)
Convolutional Encoder
320
Constituent Encoder 1 (G0)
420a
Constituent Encoder 2 (G1)
420b
Coded Bits
c0(k)
c1(k)
Partition -ing Unit
330
430a
430b
c0,e(k)
c0,o(k)
c1,e(k)
c1,o(k)
Interleaver
340
Block 0 Interleaver
440a
Block 2 Interleaver
440c
Block 1 Interleaver
440b
Block 3 Interleaver
440d
i(0,j)
i(2,j)
i(1,j)
i(3,j)
442
MUX
Output Bits
i(B,j)

FIG. 4

Paging Messag Proc ssing at Bas Station

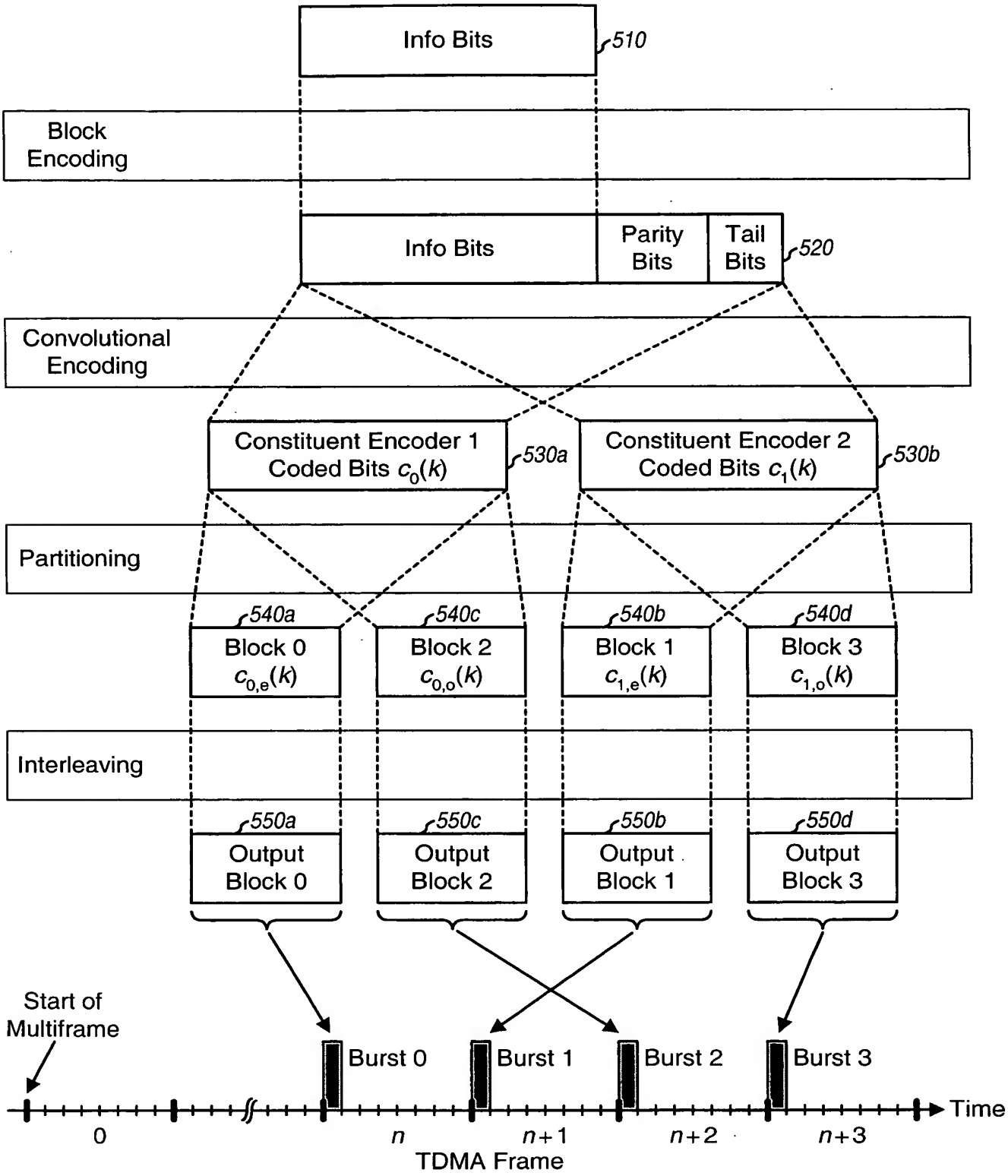

FIG. 5

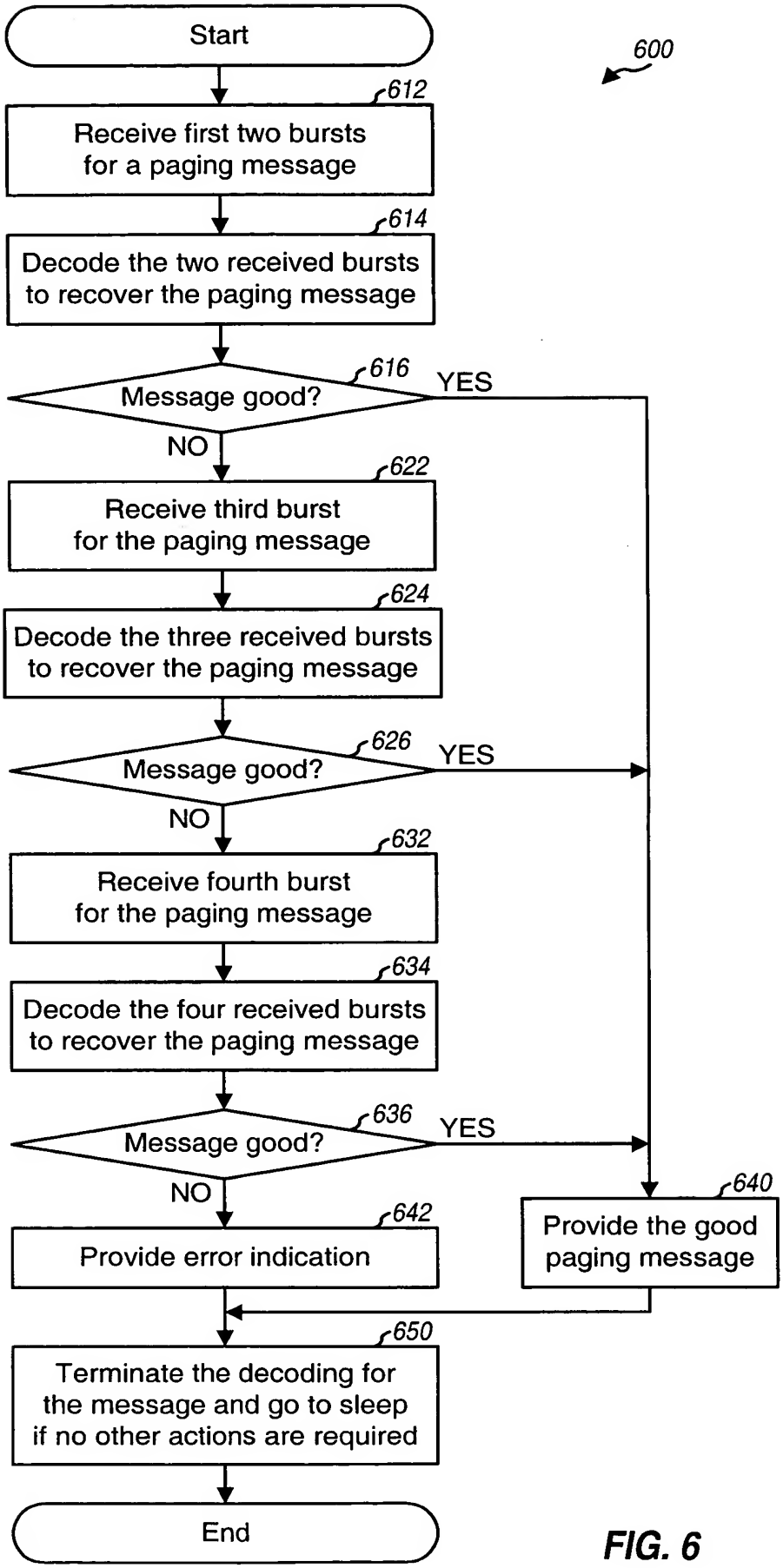
Start
600
612
Receive first two bursts for a paging message
614
Decode the two received bursts to recover the paging message
616
Message good?
YES
NO
622
Receive third burst for the paging message
624
Decode the three received bursts to recover the paging message
626
Message good?
YES
NO
632
Receive fourth burst for the paging message
634
Decode the four received bursts to recover the paging message
636
Message good?
YES
NO
640
Provide the good paging message
642
Provide error indication
650
Terminate the decoding for the message and go to sleep if no other actions are required
End

FIG. 6

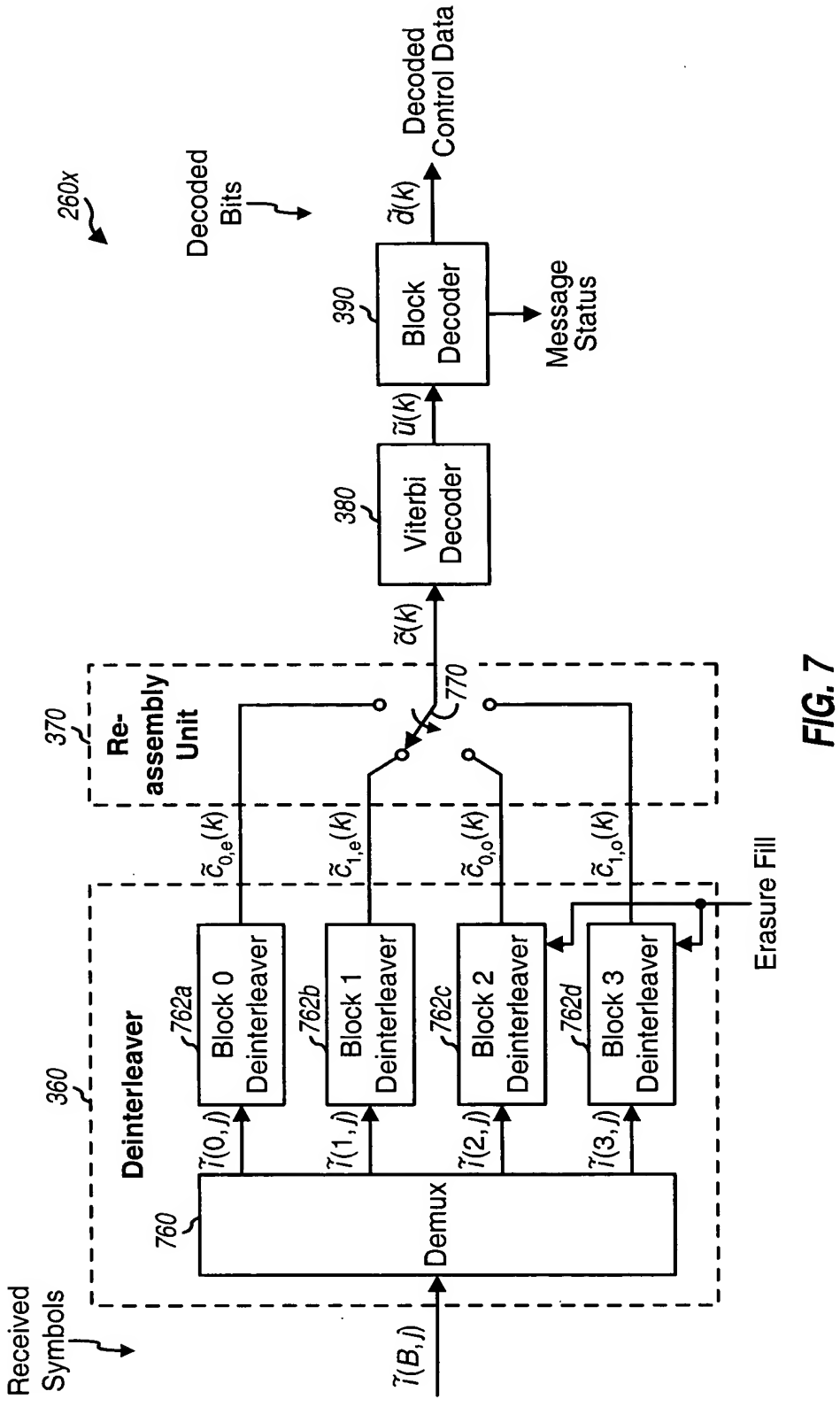
260x
Decoded Bits
Decoded Control Data
$\tilde{d}(k)$
390
Block Decoder
Message Status
$\tilde{u}(k)$
380
Viterbi Decoder
$\tilde{c}(k)$
770
370
Re-assembly Unit
$\tilde{c}_{0,e}(k)$
$\tilde{c}_{1,e}(k)$
$\tilde{c}_{0,o}(k)$
$\tilde{c}_{1,o}(k)$
360
Deinterleaver
762a
Block 0 Deinterleaver
762b
Block 1 Deinterleaver
762c
Block 2 Deinterleaver
762d
Block 3 Deinterleaver
Erasure Fill
$\tilde{i}(0,j)$
$\tilde{i}(1,j)$
$\tilde{i}(2,j)$
$\tilde{i}(3,j)$
760
Demux
Received Symbols
$\tilde{i}(B,j)$

FIG. 7

Early D coding After R c iving Two Bursts

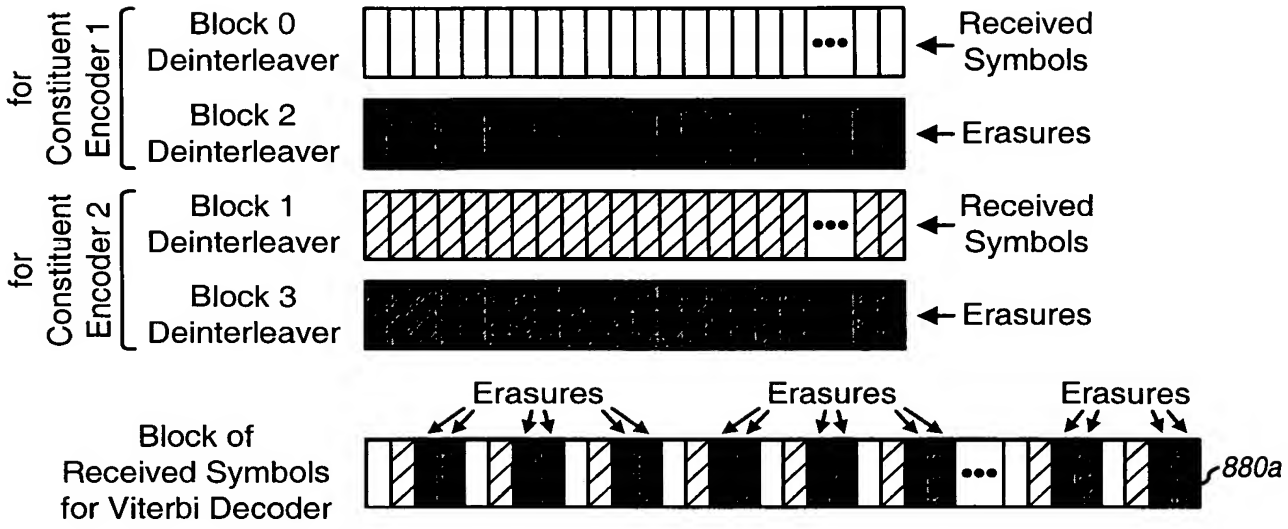

FIG. 8A

Early Decoding After Receiving Three Bursts

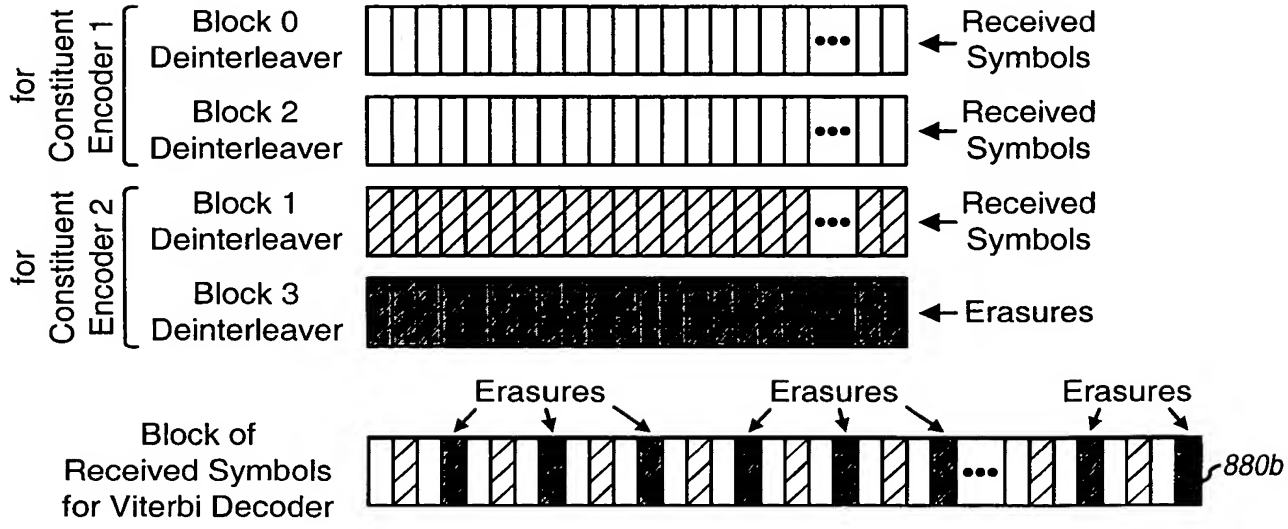

FIG. 8B

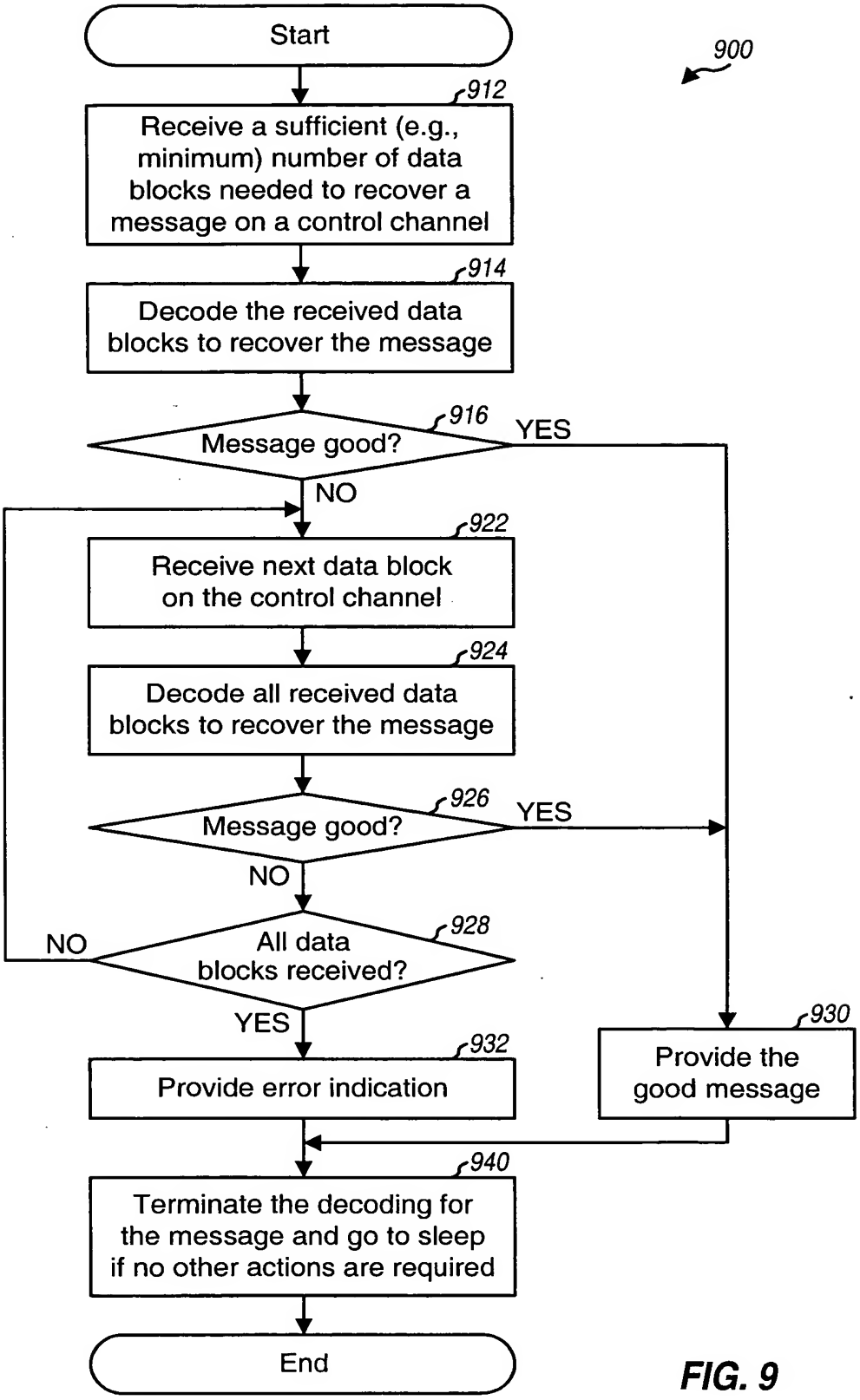
Start
900
912
Receive a sufficient (e.g., minimum) number of data blocks needed to recover a message on a control channel
914
Decode the received data blocks to recover the message
916
Message good?
YES
NO
922
Receive next data block on the control channel
924
Decode all received data blocks to recover the message
926
Message good?
YES
NO
928
All data blocks received?
NO
YES
930
Provide the good message
932
Provide error indication
940
Terminate the decoding for the message and go to sleep if no other actions are required
End

FIG. 9